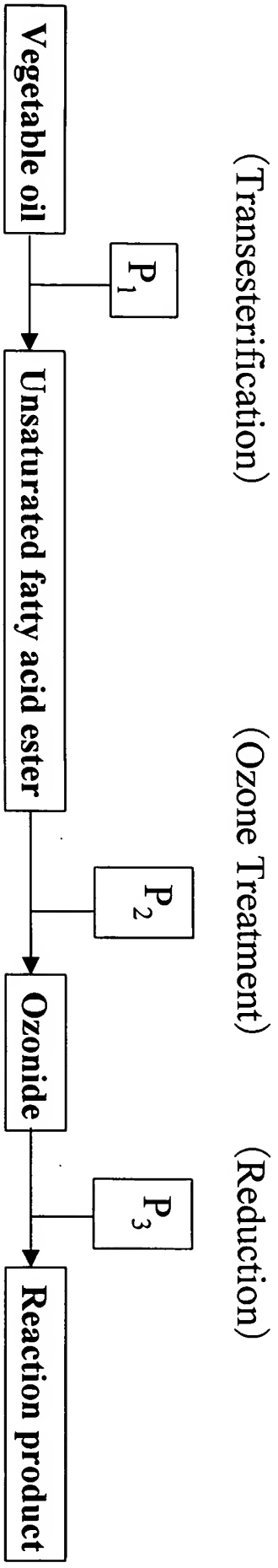
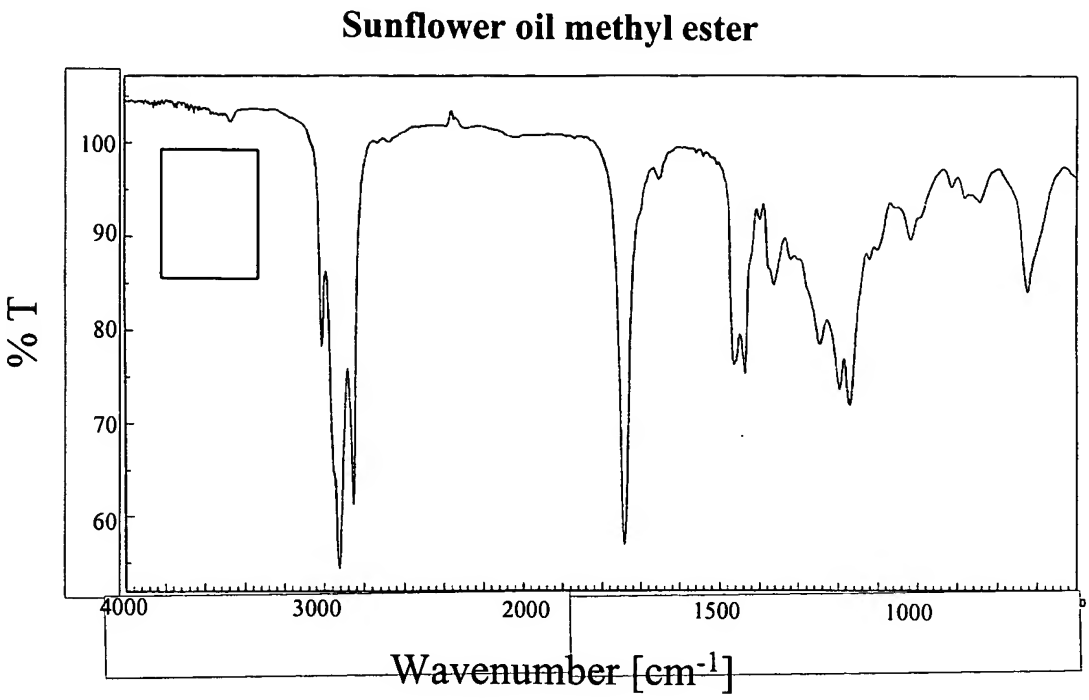
【Fig. 1】

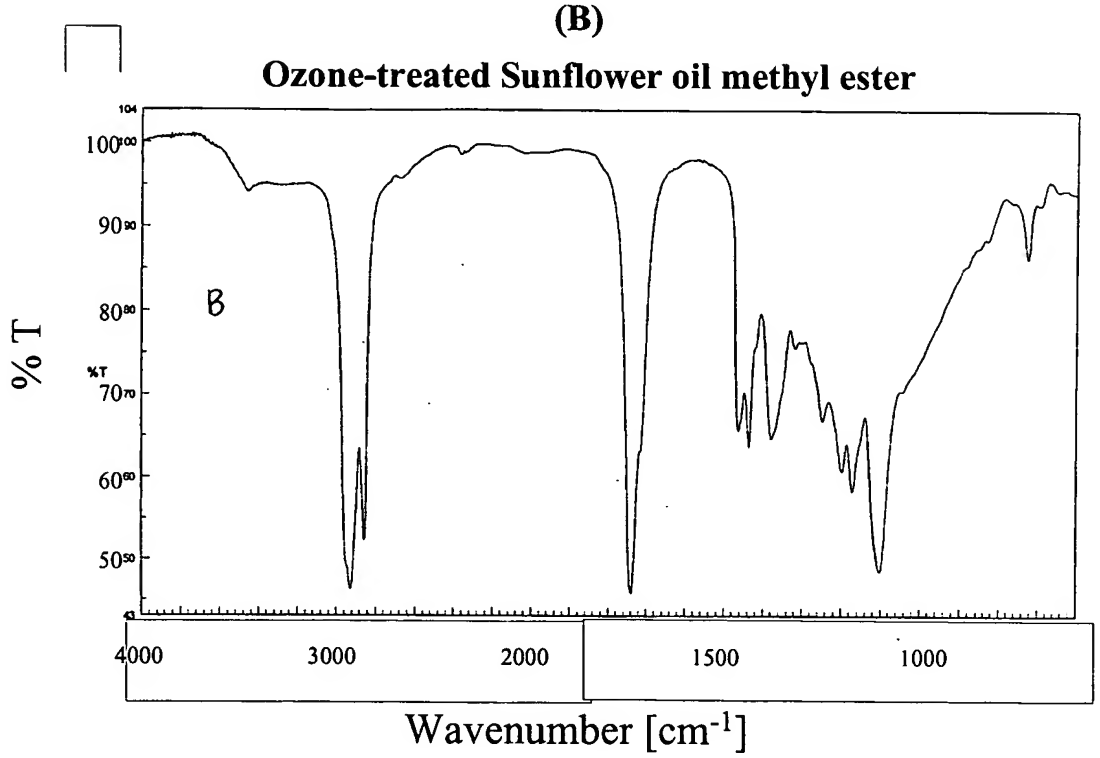

Vegetable oil
P1
(Transesterification)
Unsaturated fatty acid ester
P2
(Ozone Treatment)
Ozonide
P3
(Reduction)
Reaction product

【Fig. 2】

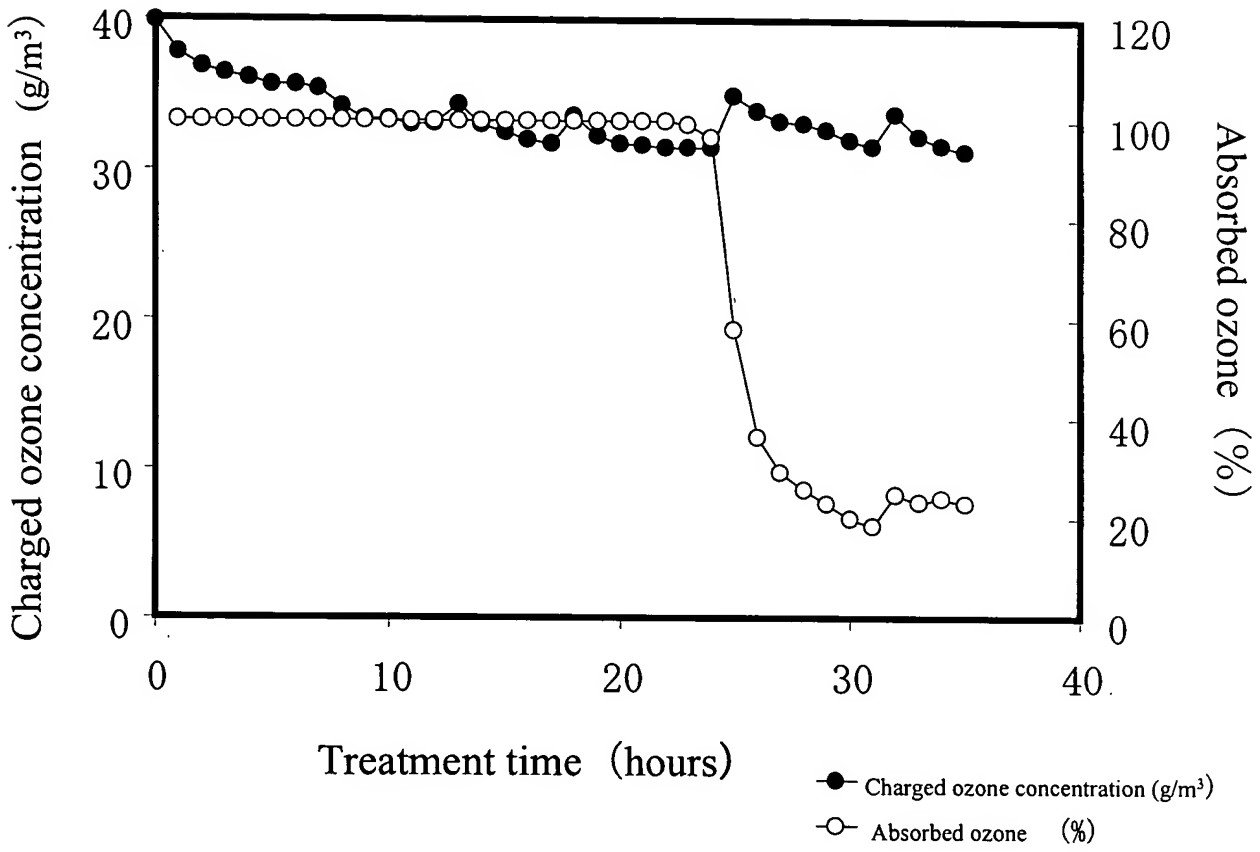
(A)


Sunflower oil methyl ester
100
90
80
70
60
% T
4000
3000
2000
1500
1000
Wavenumber [cm-1]

(B)

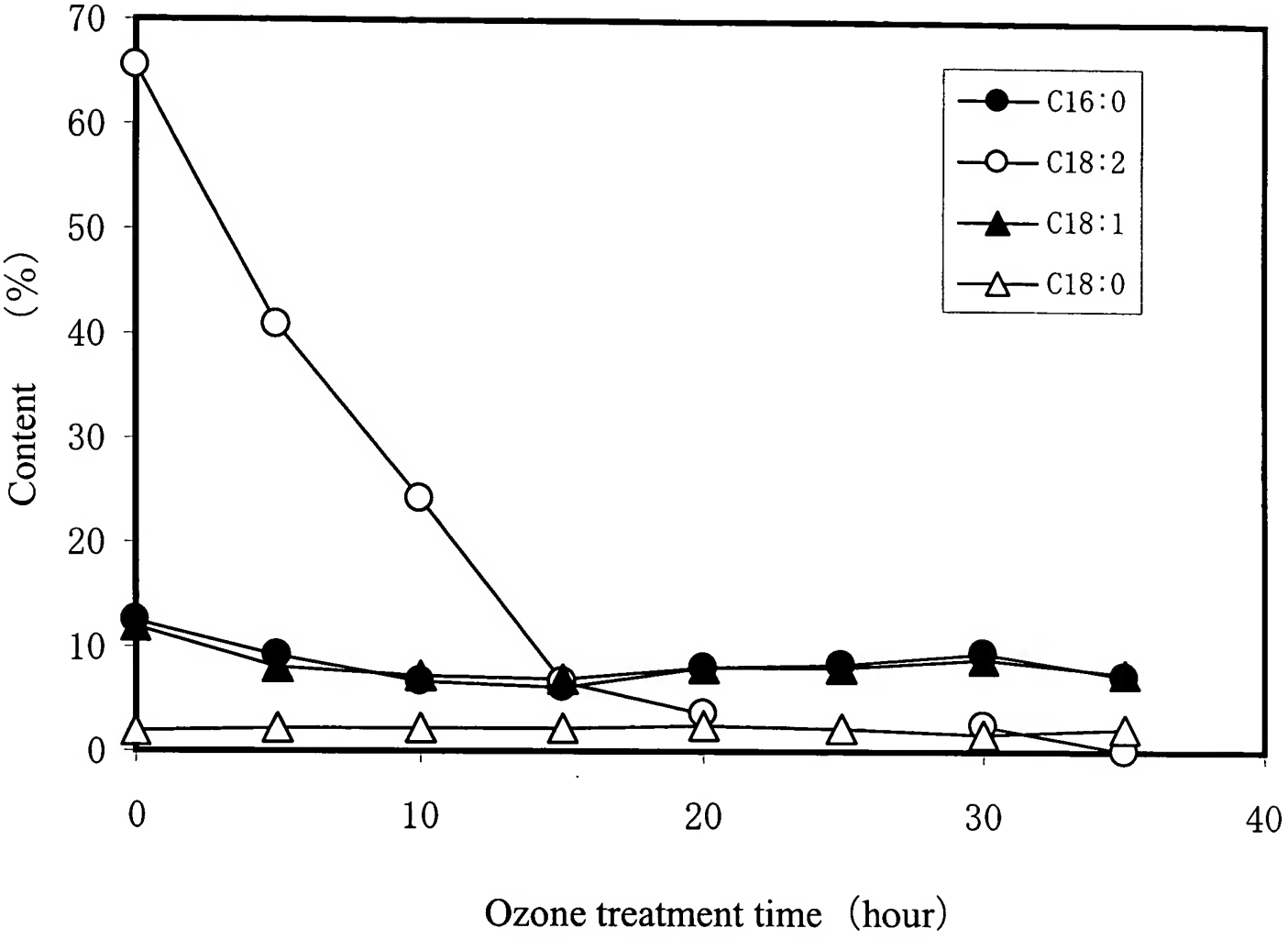

Ozone-treated Sunflower oil methyl ester
100
90
80
70
60
50
% T
4000
3000
2000
1500
1000
Wavenumber [cm-1]

【Fig. 3】



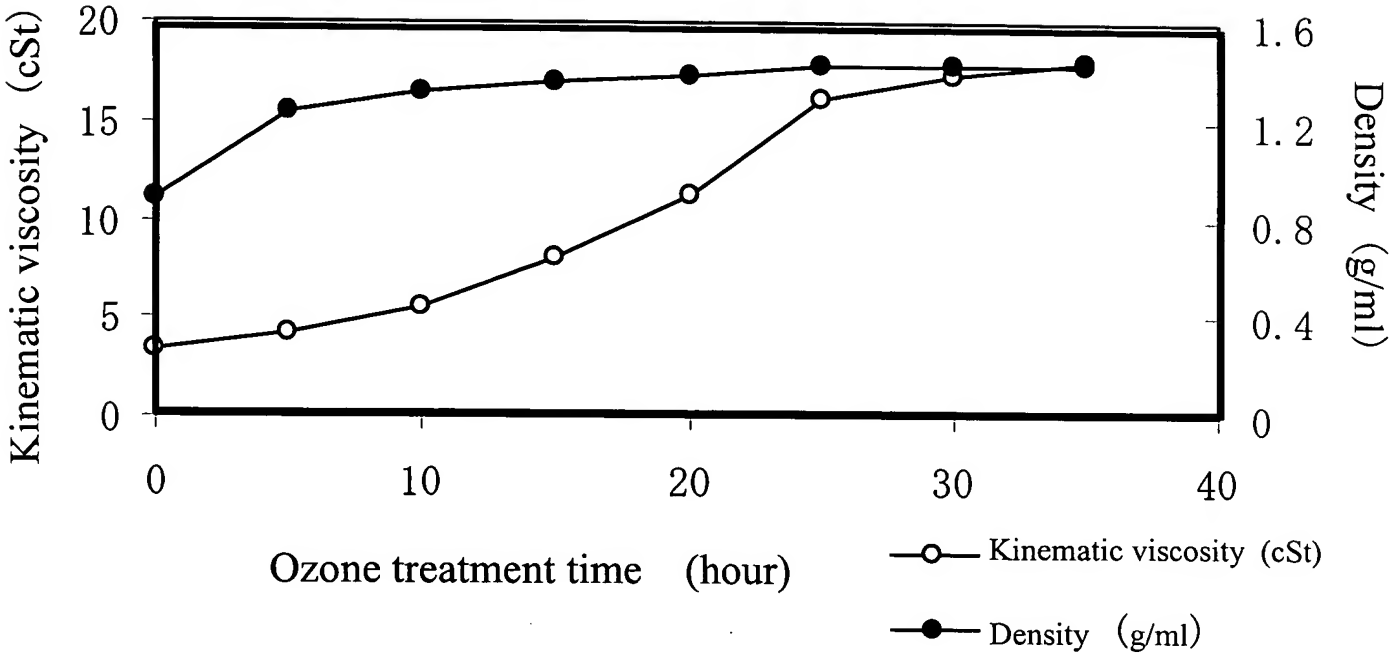
Change in ozone absorption with time be sunflower oil methyl ester

【Fig. 4】



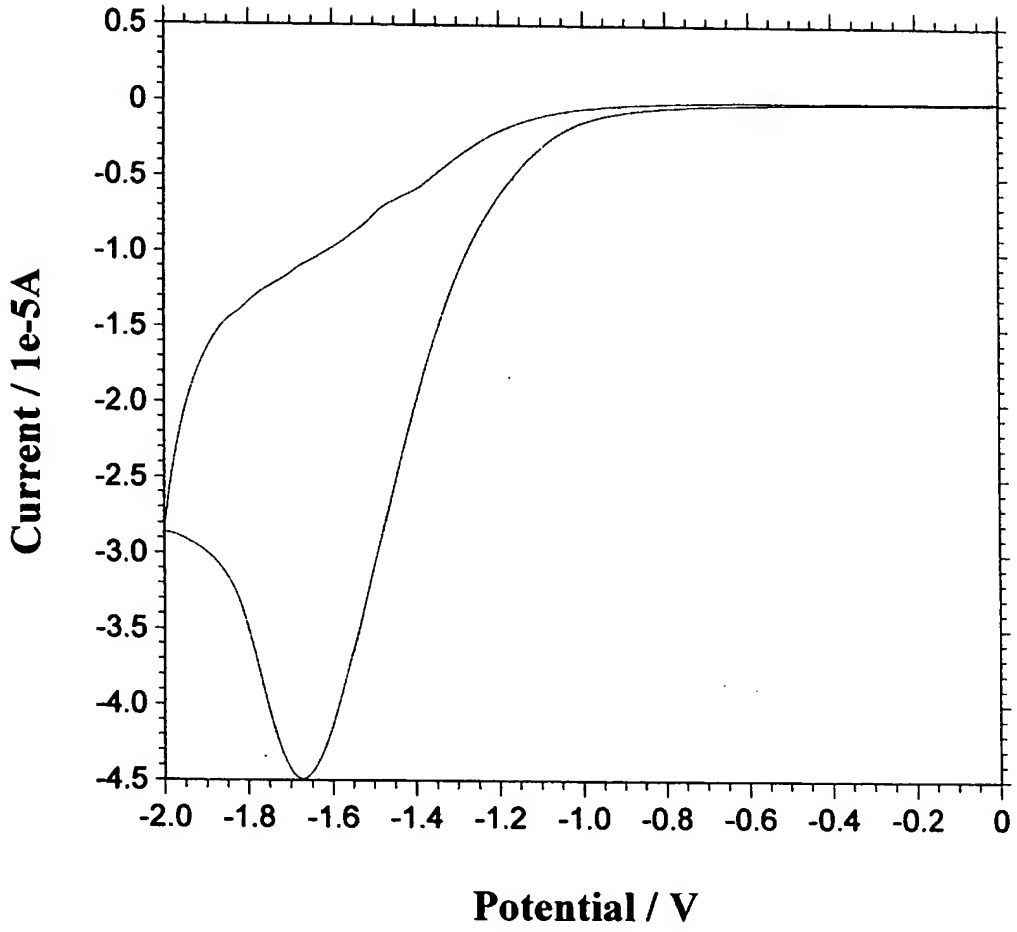
Change in composition of fatty acid methyl ester by ozone treatment

【Fig. 5】



Changes in density and kinematic viscosity by ozone treatment of sunflower oil methyl ester

【Fig. 6】

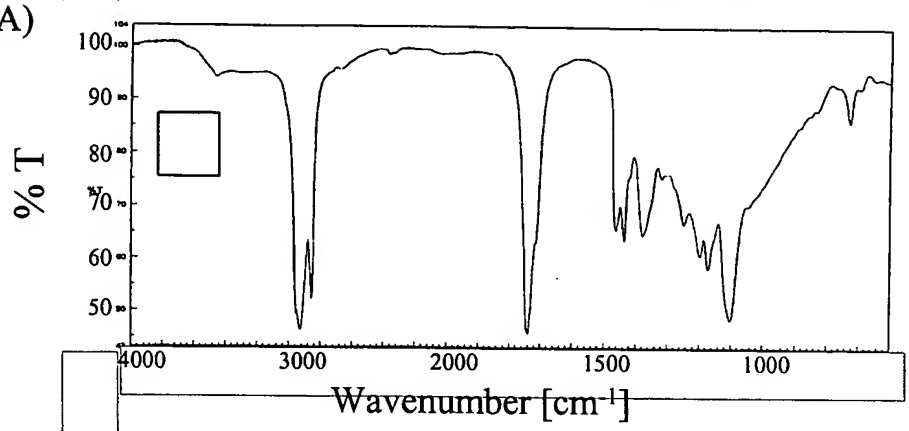


Cyclic voltameter of ozonide

【Fig. 7】

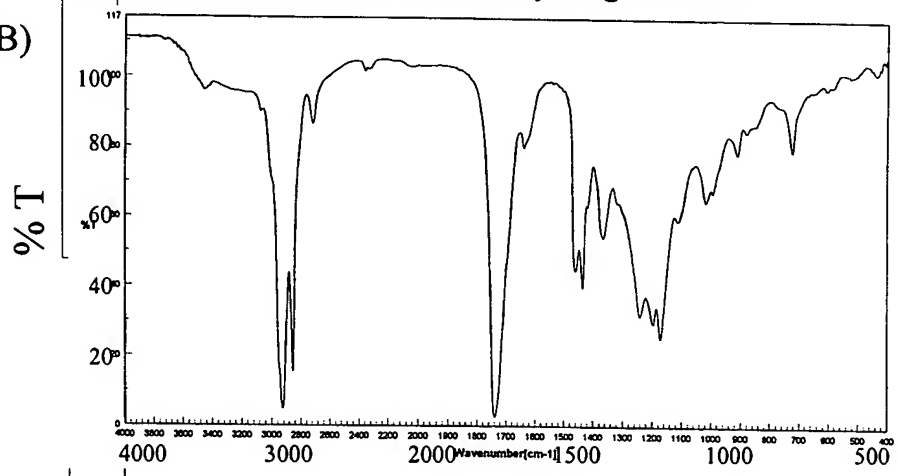
Sunflower oil methyl ester after ozone treatment

(A)



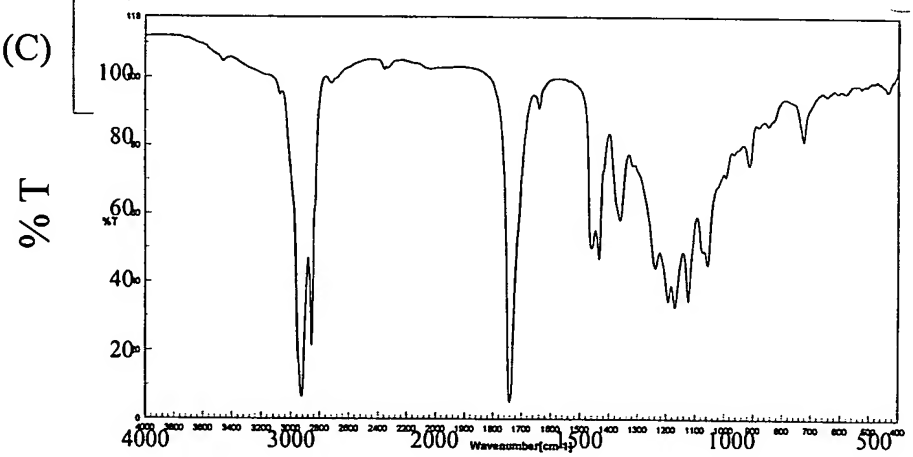
Ozone-treated sunflower oil methyl ester after electrochemical reduction treatment using acetic acid as hydrogen donor

(B)

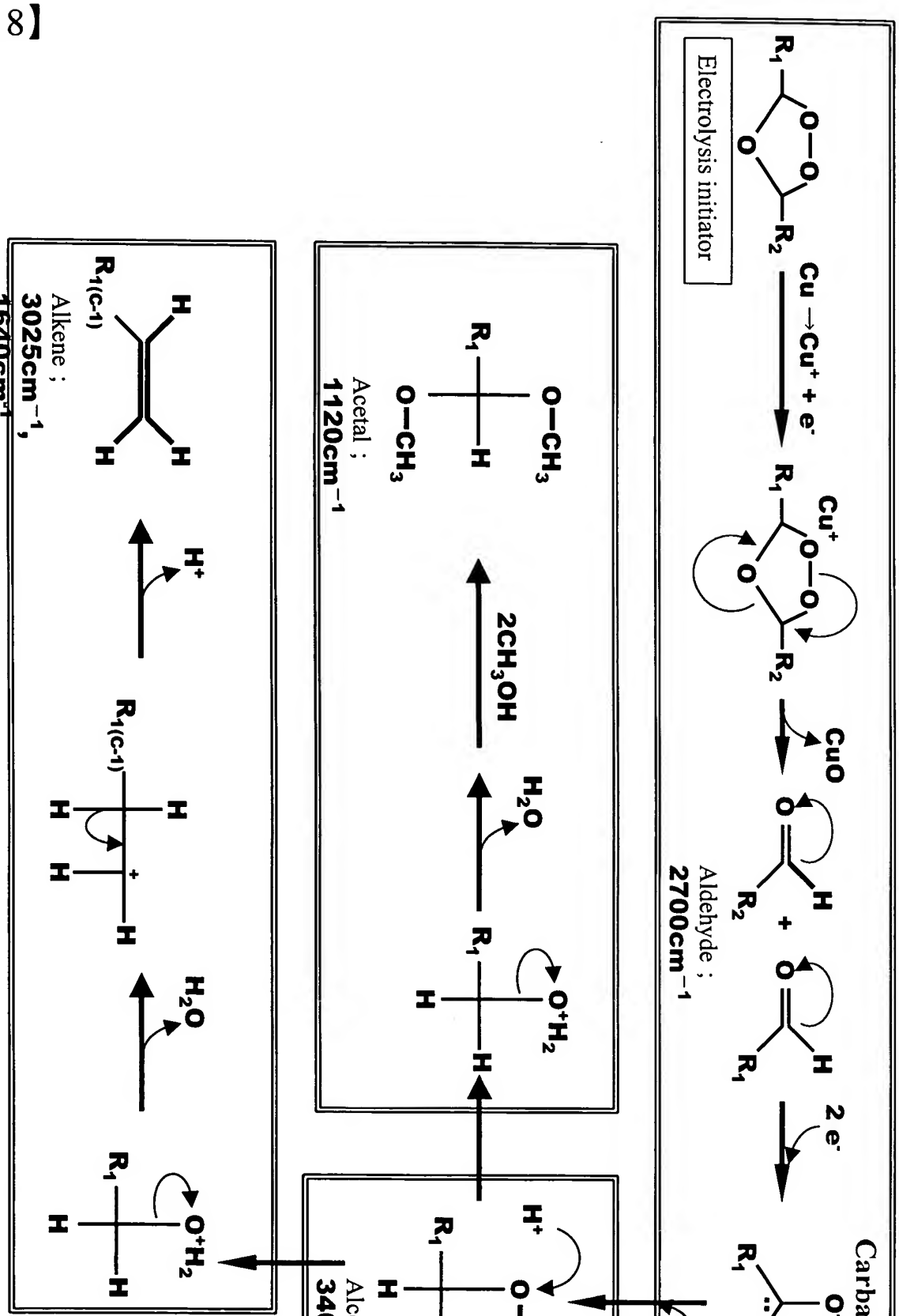


Ozone-treated sunflower oil methyl ester after electrochemical reduction treatment using acetic acid and methanol as hydrogen donor

(C)



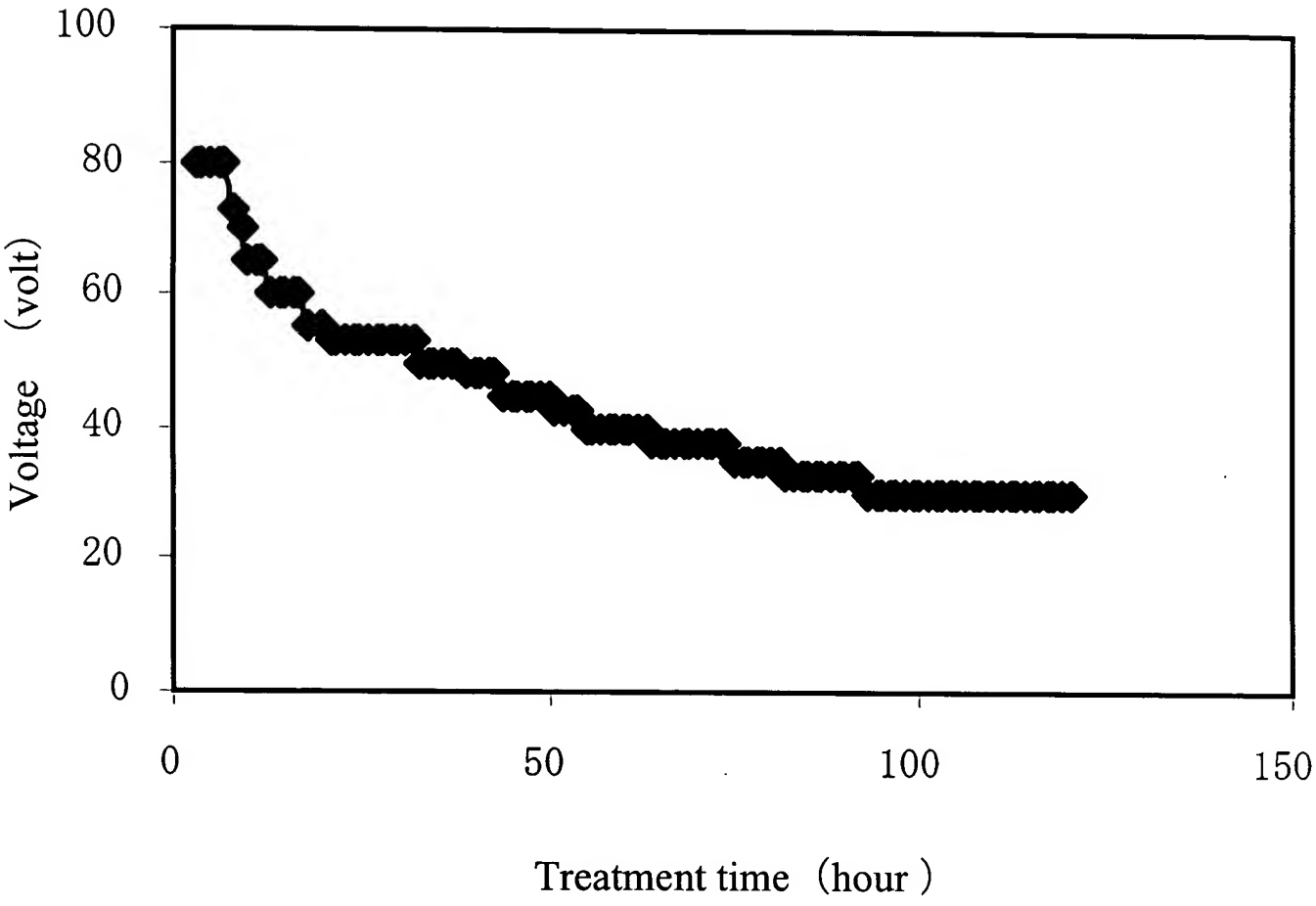
【Fig. 8】



Operating condition voltage : **25 V** Current : **1 A** Electrode : Anode/Cathode Copper

Reaction mechanism in electrochemical reduction
treatment of ozone-treated sunflower oil methyl ester

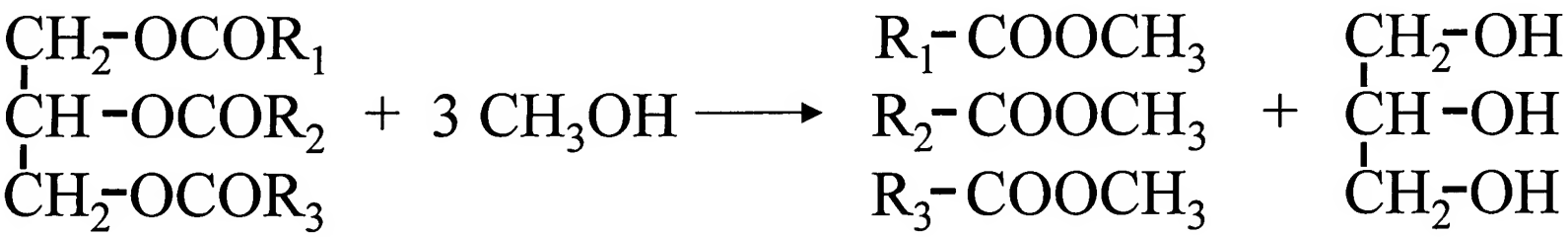
【Fig. 9】



Change in voltage in constant-current electrochemical treatment of ozonide

Masatoshi Matsumura et al
METHOD FOR PRODUCING VEGETABLE OIL FUEL
Docket No. BOH6278P0090US

【Chemical formula 1】

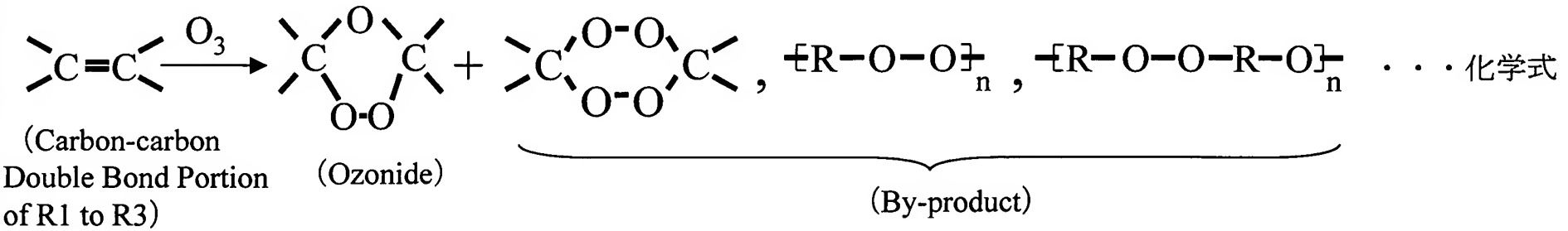


(Unsaturated Fatty Acid Methyl Ester) (Glycerin)

<R1～R3：Hydrocarbon Group including Double Bond>

Masatoshi Matsumura et al
METHOD FOR PRODUCING VEGETABLE OIL FUEL
Docket No. BOH6278P0090US

【Chemical formula 2】



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